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ASSIGNMENT BOOKLET

SCN2231 Biology 30

Module 8 Assignment

FOR STUDENT USE ONLY

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Biology 30

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Populations, Individuals, and Gene Pools

Module 8

Assignment Booklet



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Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment	45	
Lesson 2 Assignment	23	
Lesson 3 Assignment	42	
Lesson 4 Assignment	20	
Lesson 5 Assignment	12	
Lesson 6 Assignment	36	

Teacher's Comments

	Total Possible Marks	Your Mark
Lesson 7 Assignment	19	
Lesson 8 Assignment	16	
Lesson 9 Assignment	16	
Lesson 10 Assignment	29	
Lesson 11 Assignment	68	
	326	

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Module 8: Populations, Individuals, and Gene Pools
Assignment Booklet
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Other	



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MODULE 8: LESSON 1 ASSIGNMENT

This Module 8: Lesson 1 Assignment is worth 45 marks. The value of each assignment and each question is stated in the left margin.

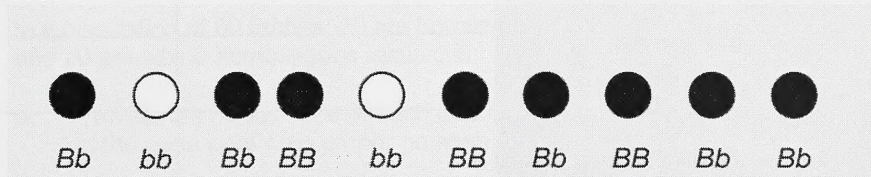
(45 marks) **Lesson 1 Assignment: Hardy-Weinberg Principle—the Gene Pool**

(27 marks) **Part A**

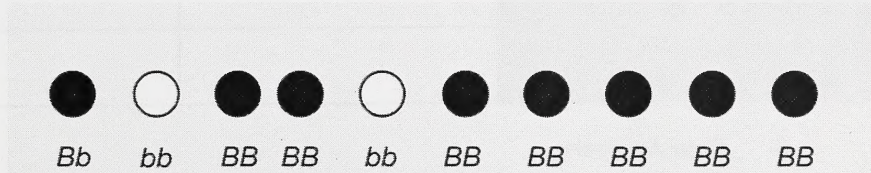
(14 marks) 1. **Determining Frequencies**

The following graphics illustrate the gene pool of the same population of ten field mice sampled five years apart. *B* symbolizes the dominant black allele, and *b* symbolizes the recessive white (albino) allele.

2000



2005



Record your answers to the following questions in the table below.

- a. Calculate the change in **phenotype** frequencies of black and white mice from 2000 to 2005.

$$\text{Example: frequency of black phenotype} = \frac{\# \text{ of black mice}}{\text{total mice}}$$

- b. Calculate the change in **genotype** frequencies from 2000 to 2005.

$$\text{Example: } f(BB \text{ genotype}) = \frac{\# \text{ of mice with } BB \text{ genotype}}{\text{total mice}}$$

- c. Calculate the change in **allele** frequencies from 2000 to 2005.

$$\text{Example: } f(B) \text{ allele} = \frac{\# \text{ of } B \text{ alleles}}{\text{total \# of alleles (= 20)}}$$

	2000	2005
Phenotype Frequencies		
$f(\text{black})$		
$f(\text{white})$		
Genotype Frequencies		
$f(BB)$		
$f(Bb)$		
$f(bb)$		
Allele Frequencies		
$f(B)$		
$f(b)$		

2. Data Analysis

Using the information from the table in question 1, answer the following questions.

(1 mark)

- a. Did the phenotype frequencies change over time? In what way?

(2 marks)

- b. Did the genotype frequencies change over time? In what way?

(2 marks)

- c. Did the allele frequencies change over time? In what way?

(1 mark)

- d. Think of a possible reason why this change might have occurred.

3. **Frequency Calculation**

In a population of 80 rabbits, 20 are homozygous dominant, 40 are heterozygotes, and 20 are albino homozygous recessive.

(5 marks)

- a. Provide the frequencies of each genotype and the frequencies of each allele in the gene pool. Use proper notation (for example, $f(AA)$).

(2 marks)

- b. Why do the frequencies add up to 1?

(18 marks) Part B**4. Hardy-Weinberg Equilibrium**

A population is in Hardy-Weinberg equilibrium (HWE) if the allele frequencies are not changing over time. Refer to the calculations you made from the table in question 1 of Part A of this lesson 1 assignment.

(2 marks)

- a. Is this population in Hardy-Weinberg equilibrium? What evidence do you have to support your decision?

(1 mark)

- b. Review the five conditions for Hardy-Weinberg equilibrium. From what you know about this population, what is one reason it could not be in HWE?

(15 marks) 5. Illustrating HWE

In the blank space provided on the next page, illustrate the five conditions of the Hardy-Weinberg equilibrium.

You will be marked on the following content:

- Have you identified each concept? (5 marks)
- Have you illustrated each mechanism? (5 marks)
- Does the illustration show comprehension, creativity, and insight? Feel free to use humour or a unique presentation. (5 marks)

Note: You will not be marked on artistic ability or complexity of the illustration. Refer to the Marking rubric provided on the next page.

MARKING RUBRIC FOR PART B

Score	
5 Excellent	• Clearly identifies all the concepts in HWE. • Illustrations clearly describe the mechanism. • Illustrations creatively and insightfully depict the mechanism.
4 Proficient	• Identifies all the concepts in HWE. • Illustrations describe the mechanism. • Illustrations show creativity.
3 Satisfactory	• Identifies most of the concepts. • Illustrations depict the mechanism in general. • Illustrations show little creativity.
2 Limited	• Identifies less than half of the concepts of HWE. • Illustrations do not correspond to the mechanisms. • Little if any creativity.
1 Poor	• Addresses only one of the bullets at a 2 or 3 level.

MODULE 8: LESSON 2 ASSIGNMENT

This Module 8: Lesson 2 Assignment is worth 23 marks. The value of each assignment and each question is stated in the left margin.

(23 marks) Lesson 2 Assignment: Causes of Change in the Gene Pool

1. Read "Mutations" on pages 689 to 691 of your textbook, and refer to "Figure 19.8" on page 690.

(2 marks)

- a. Did the mutation that produces the allele responsible for the absence of the CCR5 receptor arise as a result of high HIV infection rates in humans? In other words, did human beings adapt to HIV by producing this allele? Explain your answer.

(2 marks)

- b. Would globally widespread HIV increase the frequency of the resistance allele or decrease it? Assume that anti-HIV drugs are not available. Explain your answer.

(2 marks)

- c. Would globally widespread HIV increase the frequency of the resistance allele if anti-HIV drugs were widely available and effective? Explain your answer.

(2 marks)

- d. What conclusion can you draw about the use of anti-HIV drugs in terms of the evolution of resistance in the human population? Explain your answer.

(5 marks)

2. Even though anti-HIV drugs may prevent evolution towards resistance, can you justify not using anti-HIV drugs if they are available? Your response should consider scientific and ethical perspectives.

3. Consider the allele for HIV resistance from the perspective of the five causes of genetic change that you studied in this lesson.

(2 marks)

- a. Gene flow: How will the increased gene flow provided by rapid and accessible international travel affect the frequency of the resistance allele in the human population and the incidence of AIDS? Explain your answer.

(2 marks)

- b. Genetic drift: How would the formation of small, isolated communities affect the frequency of this allele and the incidence of AIDS in those populations? Explain your answer.

(2 marks)

- c. Non-random mating: Does the presence of mate-selection in human populations act to increase or decrease the frequency of the resistance allele and the incidence of AIDS? Support your answer.

(2 marks)

- d. Change in net mutation rate: Let's assume that there is a certain background rate of mutation from the resistant allele to the non-resistant allele, and vice versa. What would happen if the rate of mutation from the resistant to non-resistant allele increased, or vice versa? Support your answer.

(2 marks)

- e. Natural Selection: Of the three genotypes (AA , Aa , and aa), which of the three genotypes will be selected for under the current conditions? In other words, which of the three genotypes will increase in frequency? What if medical science were able to hold off the effects of AIDS for indefinite periods of time so that it became common for people with AIDS to live long enough and well enough to have children. What would this do to the frequency of the resistance allele and the incidence of AIDS? Support your answer.

MODULE 8: LESSON 3 ASSIGNMENT

This Module 8: Lesson 3 Assignment is worth 42 marks. The value of each assignment and each question is stated in the left margin.

(42 marks) Lesson 3 Assignment: Hardy-Weinberg Calculations

(9 marks) Part 1

Complete questions 1, 2, 3, and 8 on page 688 of the textbook. If possible, answer in the space provided below. If this isn't possible, discuss submission options with your teacher.

[illegible]

2. _____

3. _____

8. (a)

8. (b)

(33 marks)

Part 2: Lab

Place all of your work from “Fishy Frequencies: How Selection Affects the Hardy-Weinberg Equilibrium” in the spaces provided below.

(10 marks)

Data Collection

Your Chart (5 marks)							
Generation	Gold	Brown	q^2	q	p	p^2	$2pq$
1							
2							
3							
4							
5							

Class Chart (5 marks)							
Generation	Gold	Brown	q^2	q	p	p^2	$2pq$
1							
2							
3							
4							
5							

(23 marks) **Data Analysis**

- (5 marks) 1. Prepare a graph that shows your data and the class results. Put both sets of data on the same graph.
- On the x -axis, label generations 1 to 5; on the y -axis, label frequency (0 to 1).
 - Plot both the q and p for your data and for the class data.
 - Use one colour for your data and another colour for class data.

(2 marks) 2. What generalizations would you make about your results?

(1 mark) 3. How do your results compare to the class results?

(5 marks) 4. According to Hardy-Weinberg, what conditions would have to exist for the gene frequencies to stay the same over time?

(1 mark) 5. Why is it important to collect class data?

(1 mark) 6. Which phenotype is **not** favourable to the fish? Explain.

(1 mark) 7. What happens to the genotypic frequencies from generation 1 to generation 5?

- (1 mark) 8. What process is occurring when there is a change in genotypic frequencies over a long period of time?

- (2 marks) 9. What would happen if it were more advantageous to be heterozygous (Ff)? Would there still be homozygous fish? Explain.

- (2 marks) 10. What happens to the recessive genes over successive generations? Explain.

- (1 mark) 11. Why doesn't the recessive gene disappear from the population?

- (1 mark) 12. Explain what would happen if selective pressure changed and the recessive gene was selected for.

MODULE 8: LESSON 4 ASSIGNMENT

This Module 8: Lesson 4 Assignment is worth 20 marks. The value of each assignment and each question is stated in the left margin.

(20 marks) Lesson 4—Human Activity, Biotechnology, and Gene Pools

Research the rise in antibiotic-resistant populations of bacteria, and write a unified response evaluating the use of antibiotics. Your response should be no more than one page. Attach your response to this Assignment Booklet. Answer the following when writing your response:

- What effect does the increasing frequency of antibiotic resistance alleles in bacteria have on our potential ability to fight infectious disease in the future? (5 marks)
- What could be done to ensure that we have effective antibiotics for future use? (5 marks)
- Where do antibiotics come from, and is it possible to create new ones to replace the ineffective ones? (5 marks)
- If antibiotics were no longer effective, how would this affect the gene pool of the human species? (5 marks)

MODULE 8: LESSON 5 ASSIGNMENT

This Module 8: Lesson 5 Assignment is worth 12 marks. The value of each assignment and each question is stated in the left margin.

(12 marks) Lesson 5: Species Interactions and Symbiotic Relationships

1. In the absence of predators, parasitism is a major force of selection in human populations. With millions of kinds of parasites competing for the hospitality of a human host, some interesting relationships exist between parasites that maximize or minimize their access to the human body.

The *Anopheles* mosquito is indigenous to wet, tropical regions of the world. When the female mosquito bites a person, her goal is to suck out the rich, warm blood to incubate the eggs stored inside her abdomen. She may collect blood from several people.

At the same time, many people in tropical areas have the parasitic protist *Plasmodium* in their bloodstreams. The *Plasmodium* uses human red blood cells as incubators for its young. When the young are mature, the red blood cells (RBCs) burst, releasing the new *Plasmodia* into the bloodstream where they seek out new RBCs. When the RBCs burst, the host is said to be experiencing the disease malaria—typified as fever, chills, and intense fatigue. If enough RBCs are destroyed, the host dies.

When an *Anopheles* mosquito bites a person who carries the malaria-causing *Plasmodium*, the mosquito sucks up blood that has the *Plasmodium* in it. When the mosquito finds a second person to bite, it will unintentionally deposit some of the *Plasmodium*-laden blood into the second human, spreading malaria quite effectively. Nearly two million people worldwide—most of them children—die from malaria each year. Interestingly, with increasing global temperatures, the range of the *Anopheles* mosquito is moving northwards through the United States towards Canada.

- (5 marks)
- a. Describe the biological interrelationships between the *Anopheles* mosquito, the malaria *Plasmodium*, and the human hosts. Consider the concepts of parasitism, mutualism, commensalism, interspecific competition, and intraspecific competition. It may help to draw an arrow diagram to organize your thoughts.

Attach your response to this Assignment Booklet.

(3 marks)

- b. Co-evolution is a concept that applies to two organisms whose evolutionary success is linked together. Apply the term *co-evolution* to the scenario above. Explain your reasoning.

(4 marks)

- c. Describe two technologies or interventions that would assist in reducing access of the malarial *Plasmodium* parasite to human populations. Explain how the technologies or interventions would work.

MODULE 8: LESSON 6 ASSIGNMENT

This Module 8: Lesson 6 Assignment is worth 36 marks. The value of each assignment and each question is stated in the left margin.

(36 marks) **Lesson 6 Assignment—Role of Defence**

Attach your work from “Investigation 20.A: Interspecific and Intraspecific Competition Among Seedlings” on page 720 of your textbook to this Assignment Booklet.

The scoring guide that follows indicates the requirements for the assignment and the mark value for each portion.

Part 1

Hypothesis (1 mark)

Variables: manipulated, responding variables, two controlled variables (4 marks)

Procedure: brief, point-form (3 marks)

Completed data table (3 marks)

Graph (3 marks)

Part 2

Hypothesis (1 mark)

Variables: manipulated, responding variables, two controlled variables (4 marks)

Procedure: brief, point-form (3 marks)

Completed data table (3 marks)

Graph (3 marks)

“Analysis” questions 1 to 4 (2 marks each = 8 marks)

MODULE 8: LESSON 7 ASSIGNMENT

This Module 8: Lesson 7 Assignment is worth 19 marks. The value of each assignment and each question is stated in the left margin.

(19 marks) **Lesson 7 Assignment: Populations and Communities Changing Over Time—Succession**

(11 marks) **Part 1—Clear-Cutting Versus Selective Logging Practices**

This part of your assignment involves a comparison of two forestry practices that harvest trees for pulp and paper and lumber: clear-cutting and selective logging. Research these two practices through the Internet, library, government agencies, or other credible sources of your choice. Answer the following questions using the information you have gathered.

- (2 marks)** 1. Describe the difference between the two practices of logging.

- (1 marks)** 2. Which of these two practices results in a new succession?

(4 marks)

3. What are the advantages and disadvantages of clear-cutting and selective logging?

[illegible]

(2 marks)

4. When a mature climax lodge pole pine forest is clear-cut and replanted with only pine seedlings that will grow into pine trees (pine is the product for sale), how does this affect the natural secondary succession? What is the effect on biodiversity?

- (2 marks)** 5. When clear-cutting occurs, how does this affect the animal community that last inhabited the area? When clear-cuts are replanted with replacement trees only, how does this affect the animal community there?

(8 marks) **Part 2—Controlled Burns**

- (2 marks)** 1. List the positive and negative roles forest fires play in nature.

- (2 marks)** 2. Conduct an Internet search to find out what a “controlled burn” is. Controlled burns are typically carried out in National Parks. State two reasons for controlled burns.

- (2 marks)** 3. In the past, sometimes Aboriginal Albertans would purposely set prairie fires in the spring in a type of “controlled burn” in order to begin a secondary succession. Explain why this was done, and why this practice is no longer done.

- (2 marks)** 4. One of the first species to colonize burned forest is fireweed, a plant that makes a tall stalk of fushia-coloured flowers. Conduct an Internet search to find at least two traditional uses of this plant by Aboriginal peoples.

MODULE 8: LESSON 8 ASSIGNMENT

This Module 8: Lesson 8 Assignment is worth 16 marks. The value of each assignment and each question is stated in the left margin.

(16 marks) **Lesson 8 Assignment: Factors Influencing Growth**

Wildlife Management and Population Size

1. Wildlife managers monitor changes in population size. Population numbers must be sustainable in that populations cannot exceed the habitat's ability to support them (carrying capacity).

Coyotes are members of the *Canis* family, or dog family, that wanders natural or agricultural grasslands and temperate forest in search of rodents and small prey. Occasionally they will form packs to bring down a larger animal—perhaps a young, sick, or old deer. In this scenario, assume population numbers of coyotes have increased dramatically.

- (4 marks)** a. Using your knowledge of the ΔN formula, provide four possible causes for this dramatic increase in population.

- (4 marks)** b. Assume you are a wildlife manager and that the high coyote population is resulting in more human-coyote interactions. Steps need to be taken to correct the imbalance in coyotes. Provide two ecologically sound solutions to the problem.

2. Hunting is one way of reducing population size. Wildlife managers closely watch changes in population numbers of all wildlife species in order to determine legal hunting "bag" limits for each hunter. Depending on changes in population size, hunting bag limits are changed from year to year. In each of the following scenarios, suggest what changes might have occurred in the population in the previous year to warrant these changes in bag limits. (Address all four factors that affect population size.)

(4 marks)

- a. The mallard duck bag limit has increased from four ducks/day to eight ducks/day.

(4 marks)

- b. The previous year, one female black bear could be taken and up to three males could be taken. This year no females can be taken.

MODULE 8: LESSON 9 ASSIGNMENT

This Module 8: Lesson 9 Assignment is worth 16 marks. The value of each assignment and each question is stated in the left margin.

(16 marks) Lesson 9 Assignment—Measuring Growth

A major moose population survey was completed in 1993–94 to determine moose numbers, densities, and sex and age ratios. In Wildlife Management Area 6 (see diagram below), 46 Wildlife Management Units (WMUs) were surveyed by field biologists who counted the moose from airplanes as they circled over the WMU. The counts were done in winter so that the dark hide of the moose could be seen against the white snow.

From the entire survey area, the moose population for Area 6 was estimated at 81 000 animals. This number was considered to be near what the habitat could support. However, moose numbers in a few WMUs were significantly below that capacity, and the number of bulls in relation to the number of cows (bull : cow ratio) was lower than desired. The optimum ratio that will produce the most offspring is considered to be 40 bulls to every 100 cows.



You will be provided with data regarding moose population counts in an area named “Wildlife Management Unit 350” found in Wildlife Management Area 6. You will analyze the data using your knowledge from Lesson 9.

(2 marks) 1. **Moose Management Area 6, WMU 350**

In 1993–94, aerial counts of moose populations in Wildlife Management Unit 350 showed a density of 0.45 moose/km^2 in the 5788-km^2 area surveyed. What was the total population size (N)?

(2 marks) 2. Another population count of Moose Management Area 6, WMU 350 occurred in 1997–98. This time, the population size was estimated at 3204 moose. What was the population density (Dp)? One mark will be given for the correct formula, another for the correct answer.

(6 marks) 3. Compare the two population sizes from the two counts of WMU 350 and determine the following variables. Show your work. One mark will be given for the correct formula, another mark for the correct answer.

ΔN :

Growth rate:

Per capita growth rate:

(2 marks)

4. In the first population count, the bull : cow ratio was 23 : 100. In the second count, the number had risen slightly to 29 : 100. Is the ratio acceptable to wildlife managers? What are the consequences of this bull : cow ratio?

(4 marks)

5. Wildlife managers use hunting “harvests” as a mechanism of addressing imbalances in population sizes and sex ratios. Every year wildlife managers create a set of hunting regulations that set hunting bag limits for each Wildlife Management Unit and for each species. Bag limits state how many animals a hunter may shoot, what age, and what sex. Given the problems with the moose population in WMU 50, state two recommendations you might make as a wildlife manager in terms of hunting regulations and bag limits for this area. Explain your reasons. One mark will be given for each recommendation and for each reason.

[illegible]

MODULE 8: LESSON 10 ASSIGNMENT

This Module 8: Lesson 10 Assignment is worth 29 marks. The value of each assignment and each question is stated in the left margin.

(29 marks) Lesson 10 Assignment—Growth Patterns**(12 marks) Part A**

Assume species A was introduced into a new environment. Population counts produced the data given in the table on the right.

Graph the data from the table in the space provided. Then use the graph to answer the questions that follow.

Species A: Generation Number	Population Size (N)
1	2
2	3
3	4
4	8
5	15
6	31
7	32
8	33
9	33

- (3 marks)** 1. Is the population in this example growing in a logistic or exponential pattern? Support your answer. What is the shape of the curve?

- (1 mark)** 2. What is K (carrying capacity) in this population?

- (4 marks)** 3. List four density-dependent factors that could have contributed to environmental resistance.

- (4 marks)** 4. Provide two factors that could affect K (carrying capacity) of this environment. State whether each factor would increase or decrease K .

(7 marks) Part B

“Figure 20.22” on page 733 of your textbook illustrates the human population curve. Study the figure and complete the following questions.

- (1 mark)** 1. At approximately what year did the human population enter an exponential growth phase?

- (1 mark)** 2. Prior to that time, what was the approximate carrying capacity of Earth?

- (3 marks)** 3. State three significant technological developments that have acted to increase the carrying capacity of Earth's environment since that time.

- (2 marks)** 4. Provide two examples of density-dependent factors that are contributing to or have the potential to contribute to environmental resistance in human populations.

(10 marks) Part C

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Caribou (reindeer) live in the arctic and subarctic tundra, feeding on lichens in the winter, and willows, grasses, and sedges in the summer. Their most important predator is the wolf. The winter migration takes the caribou from the open tundra to the protection of the boreal forests; in spring they return to the calving grounds of the tundra.

During the fall rut (breeding period) the most dominant male breeds with up to 15 to 20 females, with one calf born to each mother in

the spring. The following data chart describes caribou reindeer population changes on St. Paul Island, Alaska from 1910 to 1950.

Year (Y)	Population Size (N)
1910	30
1920	125
1930	350
1940	1200
1950	0

Graph the data from the table in the space provided. Use the information from the graph to complete the following questions.

- (3 marks)** 1. Considering ONLY the information you were given in the introductory paragraph regarding reindeer reproductive habits and predation, would you predict that the population growth curve would be logistic or exponential? Support your answer.

- (2 marks)** 2. Describe the growth pattern that existed from 1910 to 1950. Support your answer.

- (1 mark)** 3. Provide a possible hypothesis explaining the changes in population between 1940 and 1950.

- (4 marks)** 4. Using the information you have been given about caribou populations, state two factors that have limited the size of the caribou population. For each, indicate whether it is a density-dependent or density-independent factor.

MODULE 8: LESSON 11 ASSIGNMENT

This Module 8: Lesson 11 Assignment is worth 68 marks. The value of each assignment and each question is stated in the left margin.

(68 marks) **Lesson 11 Assignment—*r*- and *K*-selected Growth Patterns**

(14 marks) **Part A: Zebra Mussel Invasion**



Randy Westbrooks, U.S. Geological Survey, Bugwood.org

Zebra mussels were introduced into the Great Lakes inadvertently from ballast from a European freighter. Since then, zebra mussel populations have increased rapidly and become a major ecological problem. Using the Internet, your library, or another source of information, research zebra mussel population growth in the Great Lakes. Complete the answers to the following questions.

- (2 marks)** 1. In what trophic level is the zebra mussel? Is it a predator?

- (2 marks)** 2. Which indigenous species does it compete with? Why is it such a good competitor?

- (2 marks)** 3. Identify two of its predators.

- (2 marks)** 4. Describe two detrimental effects zebra mussels have on other organism and/or the environment.

- (4 marks)** 5. Based on your research, provide at least two ecological approaches to solving or reducing the severity of the problems presented by the zebra mussel invasion.

- (2 marks)** 6. Based on your research, is the population of zebra mussels growing at an exponential or logistic rate? What evidence do you have to support your answer?

(14 marks) Part B

Using the Internet, your library, or another source of reliable information, research the similarities and differences between biological and chemical pest control. Complete the following questions.

- (8 marks)** 1. Using the information that you have found, complete the following charts with at least two advantages and two disadvantages for each chart.

CHEMICAL PEST CONTROL

Advantages	Disadvantages

BIOLOGICAL PEST CONTROL

Advantages	Disadvantages

- (6 marks)** 2. Give two examples of biological control, including

- the name of the pest
- the name of the control organism
- the name of the crop species involved

(40 marks) Part C

Turn to "Thought Lab 20.5: Population Growth Rates in Different Countries" on page 734 of your textbook.

- (25 marks)** 1. Complete the calculations and questions from the textbook. **Note:** You are only required to calculate answers for Canada, Germany, Nigeria, and India.

Attach your responses to this Assignment Booklet.

- (10 marks)** 2. Place your comparative growth curve graph in this section. You are only required to graph data from Canada, Germany, India, and Nigeria. Use a legend and colour to distinguish between countries. Make sure to label axes and provide titles.

3. What conclusions can you make from this exercise? Refer to the problem statement.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question 1 (1 point)

Which of the following is NOT a characteristic of a good research question? (Select all that apply.)

Answer 1: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 2: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 3: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 4: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 5: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 6: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 7: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 8: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 9: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 10: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 11: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 12: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 13: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 14: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.

Answer 15: ☐ It is too broad. ☐ It is too narrow. ☐ It is too vague. ☐ It is too specific.